

M38a Comparison between chromospheric field derived from He I 10830 Å observation and nonlinear force-free field modeling from photosphere

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In the solar corona, magnetic field plays an important role in the dynamics of the plasmas, although it is difficult to be observed due to the weakness of coronal magnetic fields and therefore low polarization signal. As an alternative, nonlinear force-free field (NLFFF) modeling has been used to derive magnetic field in the corona. However, the assumption of NLFFF modeling that the plasma β is low ($\ll 1$) is thought to be incorrect in the photosphere. We derived the chromospheric field by two different methods, from He I 10830 Å observation and NLFFF modeling from photosphere. We discuss the difference between them and the cause of the difference.

We analyzed He I 10830 Å data of the pore region observed with the GREGOR telescope. We inverted the polarimetric data by HAZEL code (Asensio Ramos et al. 2008). We applied NLFFF modeling to photospheric field observed with *Solar Dynamics Observatory*. We compared chromospheric magnetic field distributions derived from each method, and found that in stronger field regions ($>500\text{G}$), they show positive correlation although there are large dispersions. On the other hand, in the weaker field region ($<500\text{G}$), the magnetic field from He I 10830 Å shows stronger field strength. Because the chromospheric magnetic field map derived from He I 10830 Å shows less smooth distribution in some regions, we will discuss the validity of the inversion result and the possibility of the derivation of the magnetic field from the low He I 10830 Å absorption region.